PT4606A

Complementary High Density Trench MOSFET

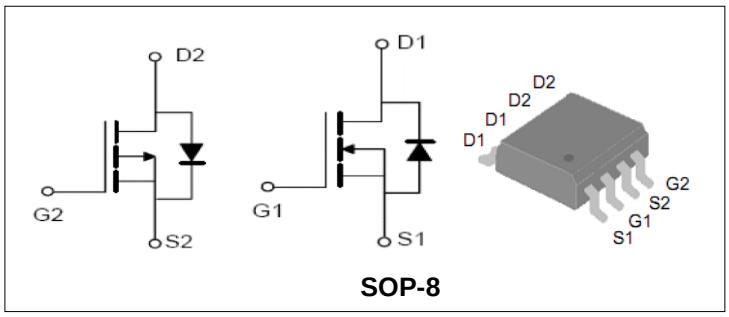
Features

- Improved dv/dt Capability, High Ruggedness·
- Maximum Junction Temperature Range (150°C)
- 100% Avalanche Tested

Applications

- PWM applications
- Load switch
- Power management

N-Channel		
BVDSS	30	V
ID	5.8	A
RDSON@VGS=10V	16	mΩ
RDSON@VGS=4.5V	23	mΩ



SOP-8

P-Channel		
BVDSS	-30	V
ID	-6.5	A
RDSON@VGS=-10V	25	mΩ
RDSON@VGS=-4.5V	37	mΩ

Order Information

Product	Package	Marking	Reel Size	Reel	Carton
PT4606A	SOP-8	PT4606A	13inch	3000PCS	48000PCS

Absolute Maximum Ratings

Symbol	Parameter		N-Channel	P-Channel	Unit
	Common Ratings (TC=25°C Unless Otherwise Noted)				
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage		30	-30	V
V_{GS}	Gate-Source Voltage		±20	±20	V
T_J	Maximum Junction Temperature		150	150	°C
T_{STG}	Storage Temperature Range		-55 to 150	-55 to 150	°C
I_S	Diode Continuous Forward Current	TA =25°C	5.8	-6.5	A
	Mounted on Large Heat Sink				
I_{DM}	Pulse Drain Current Tested (Sillicon Limit) (Note1)	TA =25°C	20	-30	A
I_D	Continuous Drain current	TA =25°C	5.8	-6.5	A
P_D	Maximum Power Dissipation	TC =25°C	2	2	W
$R_{\theta JA}$	Thermal Resistance Junction−to−Ambient (Note2)		63.2	63.2	°C/W

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N-Channel Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain- Source Breakdown Voltage	VGS=0V ID=250μA	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain current	VDS=30V,VGS=0V	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	VDS=VGS,ID=250μA	1	1.5	3	V
$R_{DS(ON)}$	Drain-Source On-State Resistance (Note3)	VGS=10V, ID=5.8A	--	16	22	mΩ
		VGS=4.5V, ID=5A	--	23	25	mΩ
g_{FS}	Forward Transconductance	VDS=5V,ID=5A	--	6	--	S
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated) (Note4)						
C_{iss}	Input Capacitance	VDS= 15V, VGS=0V, F=1MHz	--	458	--	pF
C_{oss}	Output Capacitance		--	79	--	pF
C_{rss}	Reverse Transfer Capacitance		--	63	--	pF
Q_g	Total Gate Charge	VDS= 10V, ID= 1A, VGS= 10V	--	7.4	--	nC
Q_{gs}	Gate-Source Charge		--	1.7	--	nC
Q_{gd}	Gate-Drain Charge		--	1.3	--	nC
Switching Characteristics (Note4)						
$t_{d(on)}$	Turn-on Delay Time	VDD= 15V, RL=15Ω, ID=1A, VGEN=10V, RG=6Ω	--	8	--	nS
t_r	Turn-on Rise Time		--	11.2	--	nS
$t_{d(off)}$	Turn-off Delay Time		--	17.2	--	nS
t_f	Turn-off Fall Time		--	7.54	--	nS
Source- Drain Diode Characteristics@ TJ = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage (Note3)	IS=2.3A,VGS=0V	--	--	1.2	V

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P-Channel Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain- Source Breakdown Voltage	VGS=0V ID=-250μA	-30	--	--	V
I_{DSS}	Zero Gate Voltage Drain current	VDS=-30V,VGS=0V	--	--	-1	μA
I_{GSS}	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	VDS=VGS,ID=-250μA	-1	-1.5	-3	V
$R_{DS(ON)}$	Drain-Source On-State Resistance (Note3)	VGS=-10V, ID=-6.5A	--	25	34	mΩ
		VGS=-4.5V, ID=-5A	--	37	56	mΩ
g_{FS}	Forward Transconductance	VDS=-10V,ID=-6A	--	12.7	--	S
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated) (Note4)						
C_{iss}	Input Capacitance	VDS= -15V, VGS=0V, F=1MHz	--	1320	--	pF
C_{oss}	Output Capacitance		--	651	--	pF
C_{rss}	Reverse Transfer Capacitance		--	448	--	pF
Q_g	Total Gate Charge	VDS= -15V, ID= -3A, VGS= -10V	--	20	--	nC
Q_{gs}	Gate-Source Charge		--	4.1	--	nC
Q_{gd}	Gate-Drain Charge		--	2.6	--	nC
Switching Characteristics (Note4)						
$t_{d(on)}$	Turn-on Delay Time	VDD=- 15V, RL=5Ω, ID=-3A, VGEN=-10V, RG=6Ω	--	9.5	--	nS
t_r	Turn-on Rise Time		--	5.4	--	nS
$t_{d(off)}$	Turn-off Delay Time		--	42.5	--	nS
t_f	Turn-off Fall Time		--	13.6	--	nS
Source- Drain Diode Characteristics@ TJ = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage (Note3)	IS=-1A,VGS=0V	--	--	-1	V

Note:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec
3. Pulse Test: pulse width ≤ 300 us, duty cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

Complementary High Density Trench MOSFET

Typical Characteristics(N-Channel)

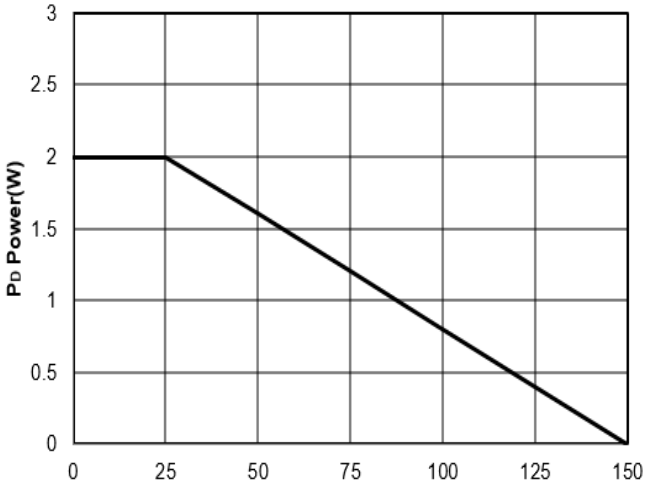


Figure1：T_J Junction Temperature（°C）

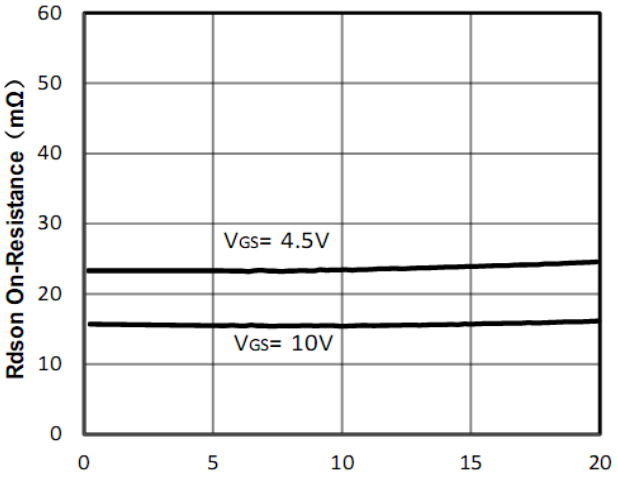


Figure2：I_D Drain Current（A）

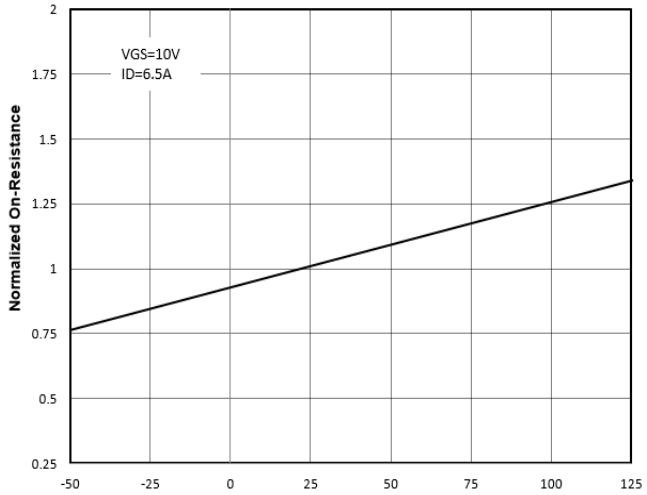


Figure3：T_J Junction Temperature（°C）

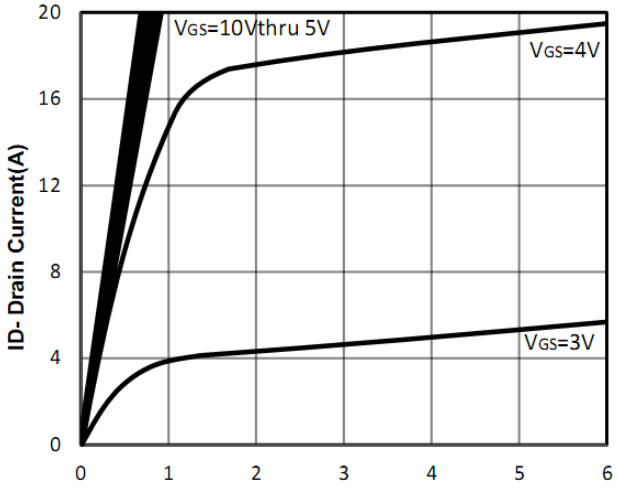


Figure4：V_{DS} Drain-Source Voltage（V）

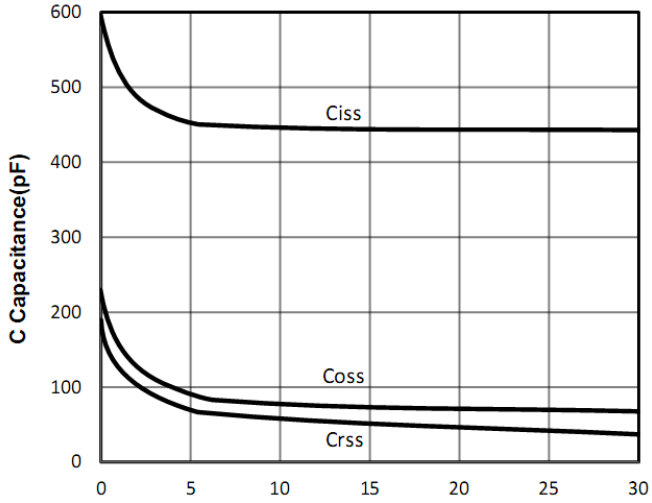


Figure5：V_{DS} Drain-Source Voltage（V）

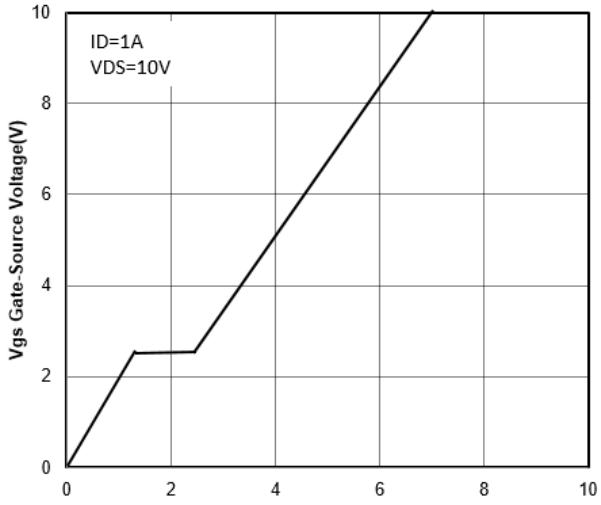


Figure6：Qg Gate Charge（nC）

Complementary High Density Trench MOSFET

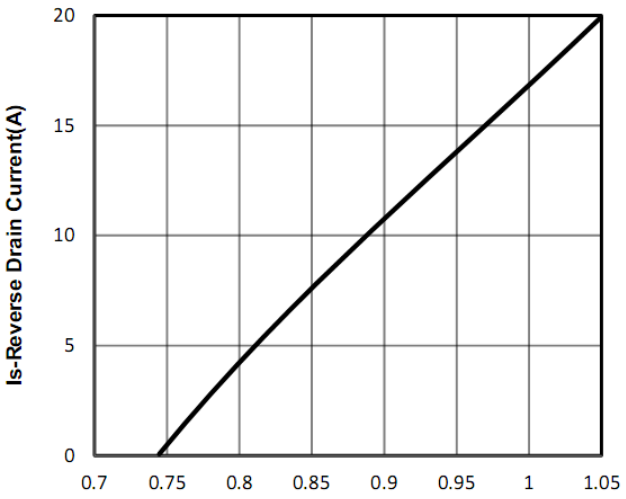


Figure7：Vsd Source-Drain Voltage（V）

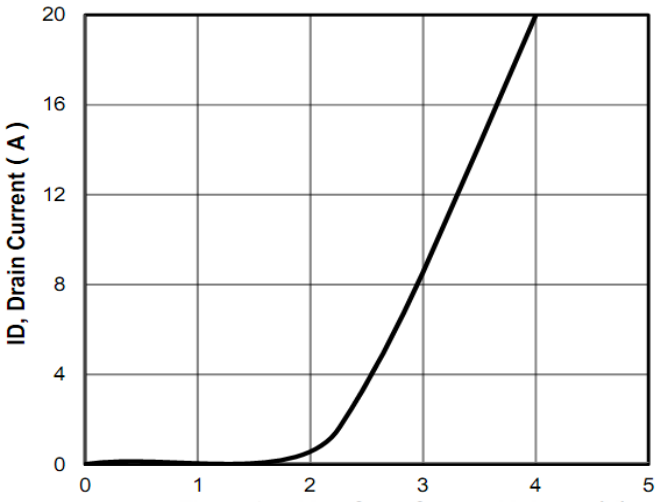


Figure8：Vgs Gate-Source Voltage（V）

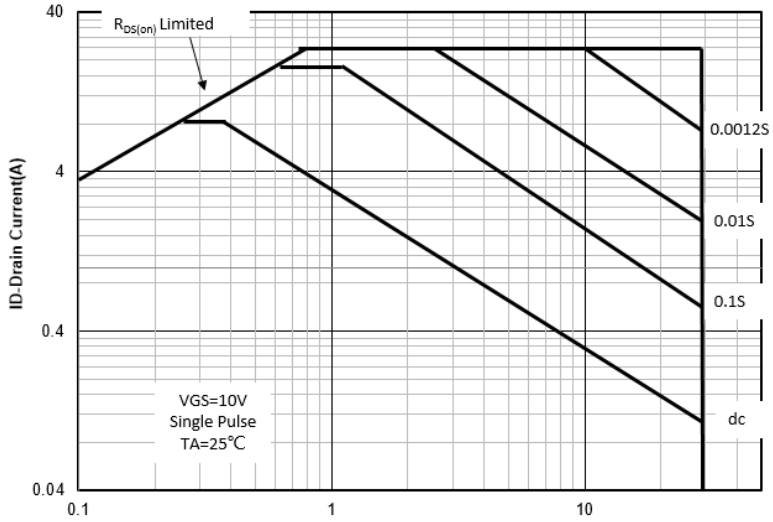


Figure9：Vds Drain -Source Voltage（V）

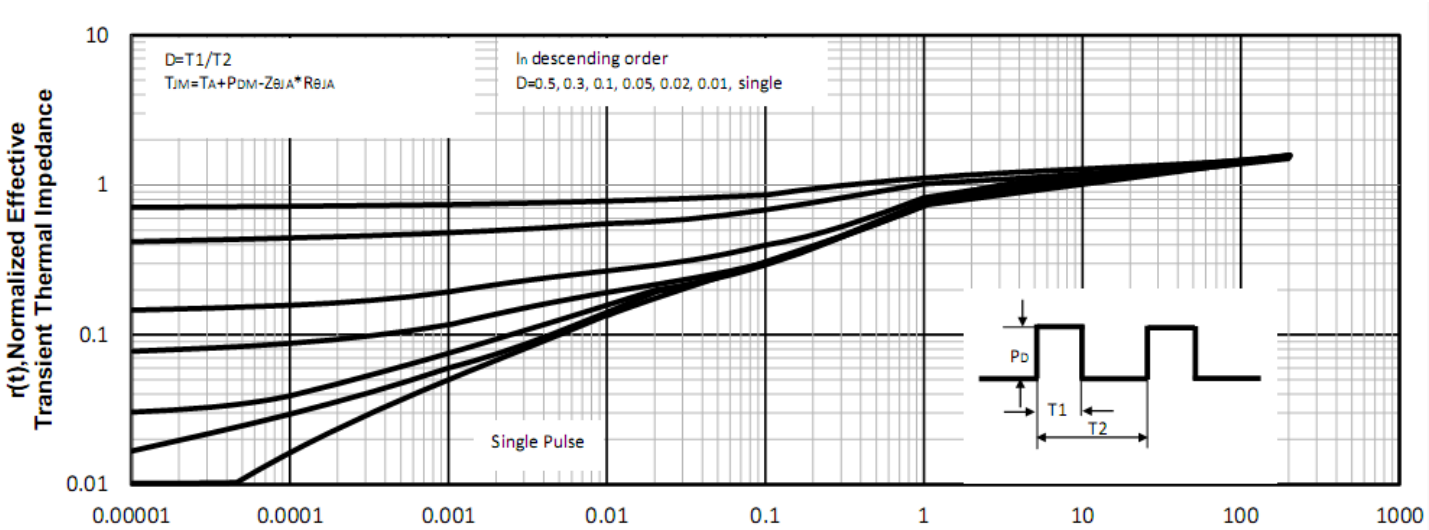


Figure10：Square Wave Pulse Duration（sec）

Complementary High Density Trench MOSFET

Test Circuit and Waveform(N-Channel):

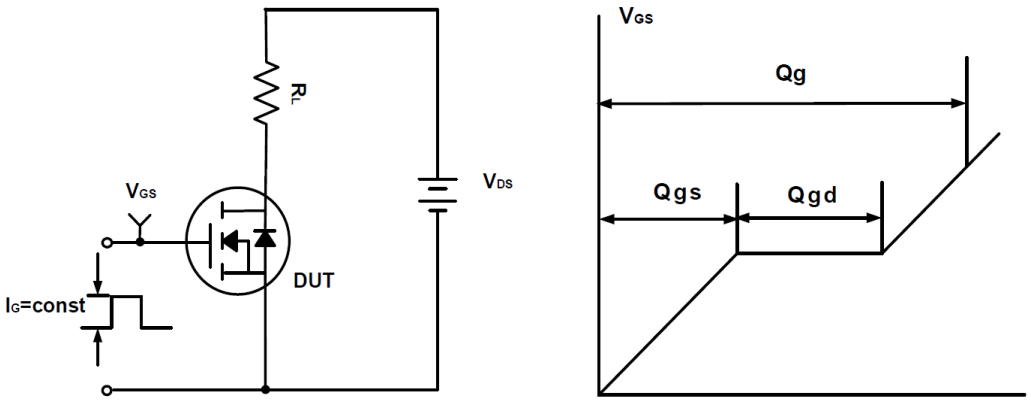


Figure A Gate Charge Test Circuit &Waveforms

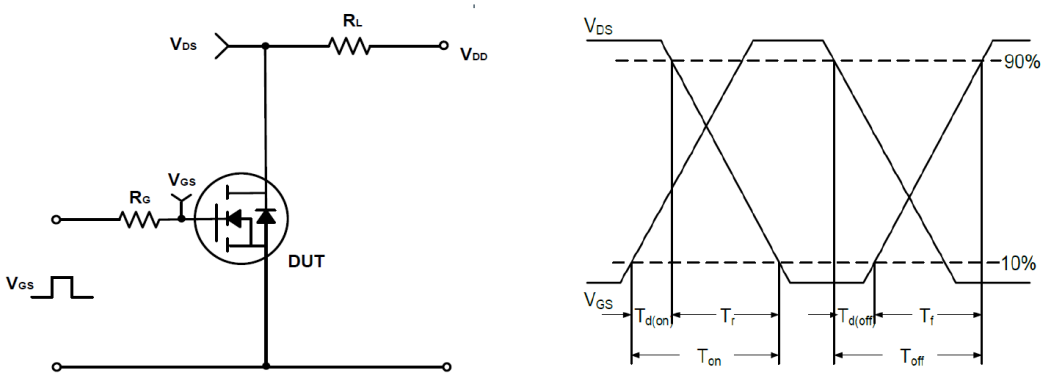


Figure B Switching Test Circuit & Waveforms

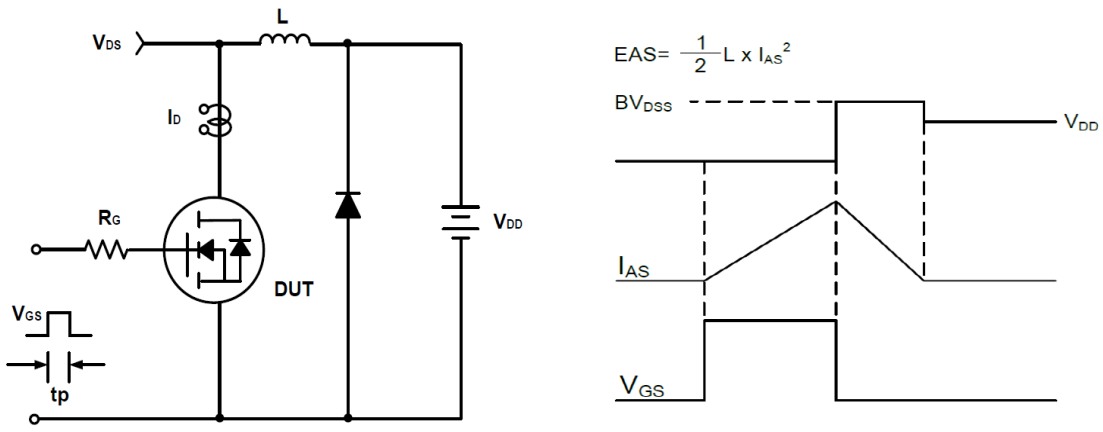


Figure C Unclamped Inductive Switching Circuit & Waveforms

Complementary High Density Trench MOSFET
Typical Characteristics(P-Channel)

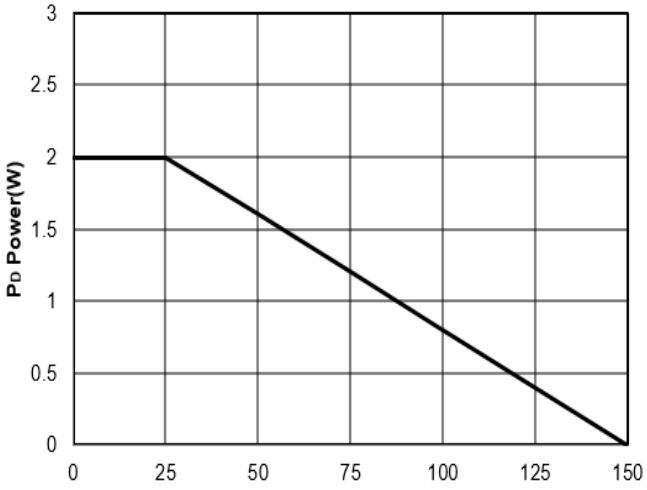


Figure11：TJ Junction Temperature（°C）

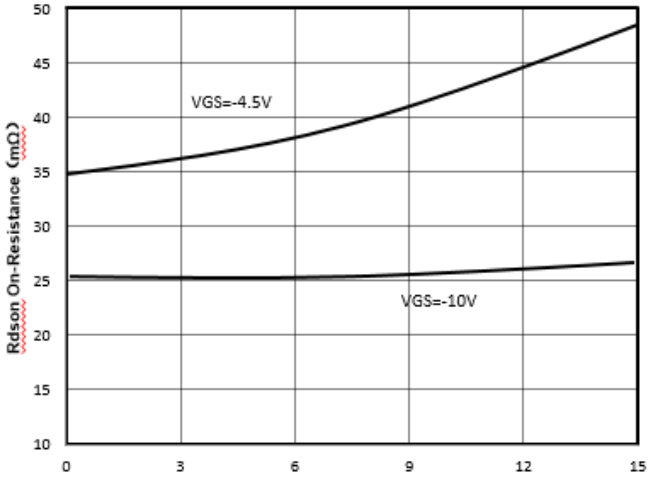


Figure12：-ID Drain Current（A）

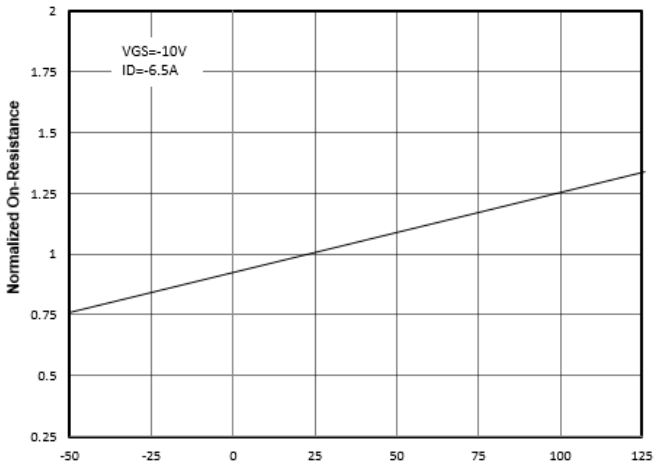


Figure13：TJ Junction Temperature（°C）

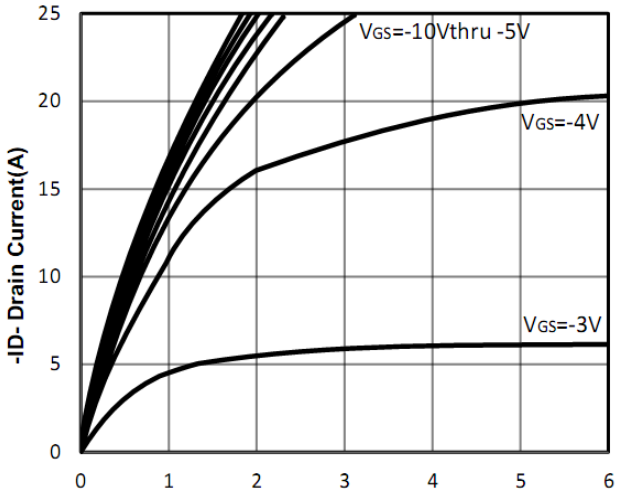


Figure14：-VDS Drain-Source Voltage（V）

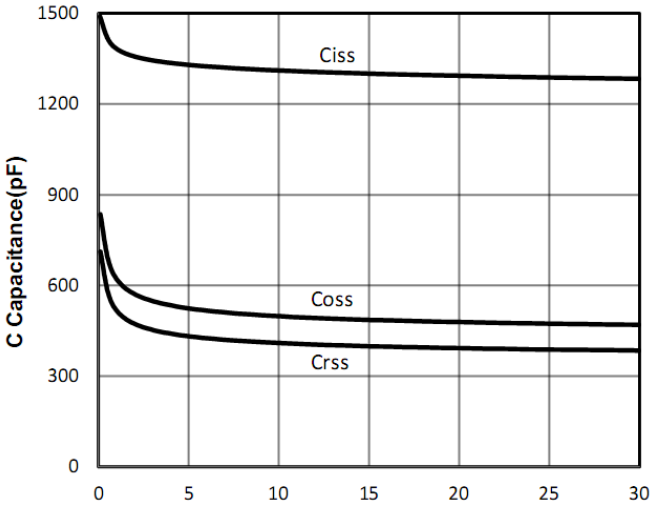


Figure15：-VDS Drain-Source Voltage（V）

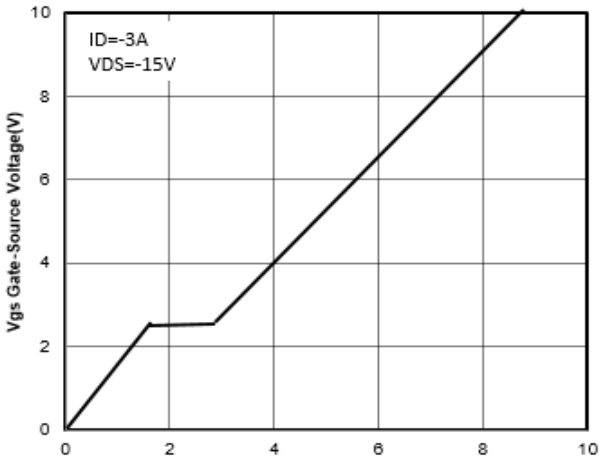


Figure16：Qg Gate Charge（nC）

Complementary High Density Trench MOSFET

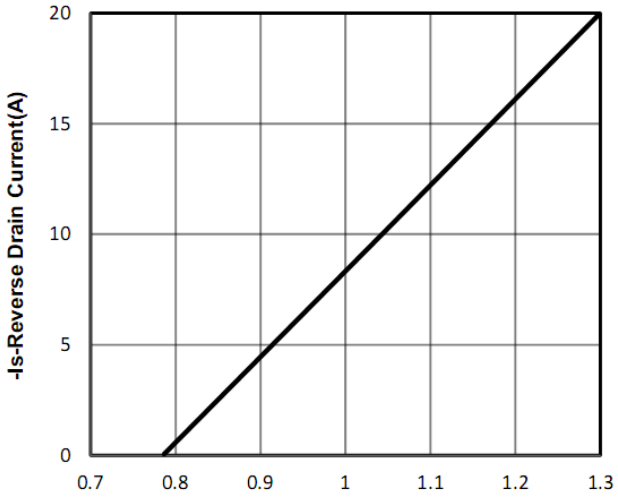


Figure17：-Vsd Source-Drain Voltage（V）

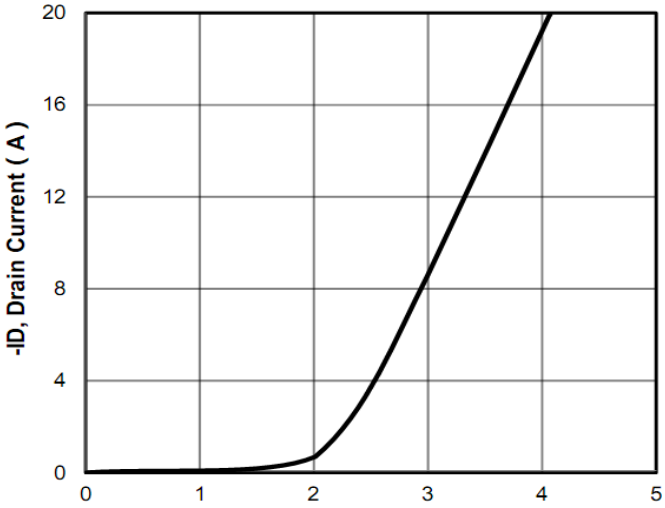


Figure18：-Vgs Gate-Source Voltage（V）

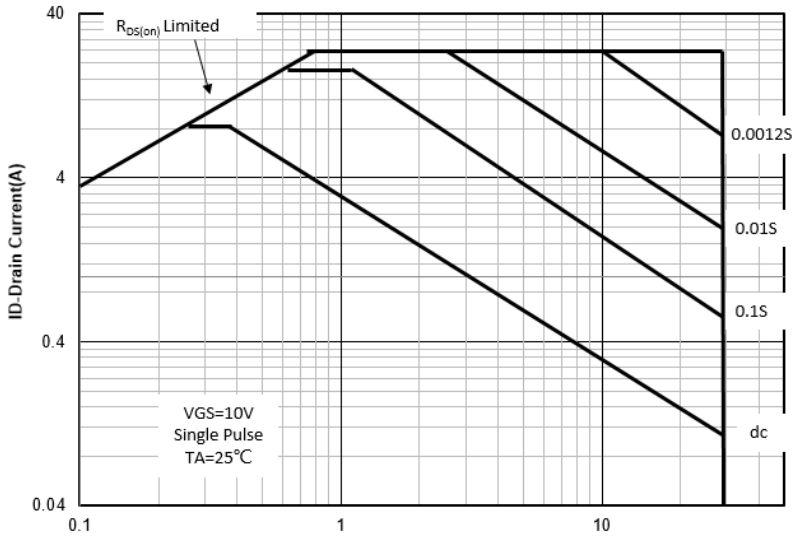


Figure19：-Vds Drain -Source Voltage（V）

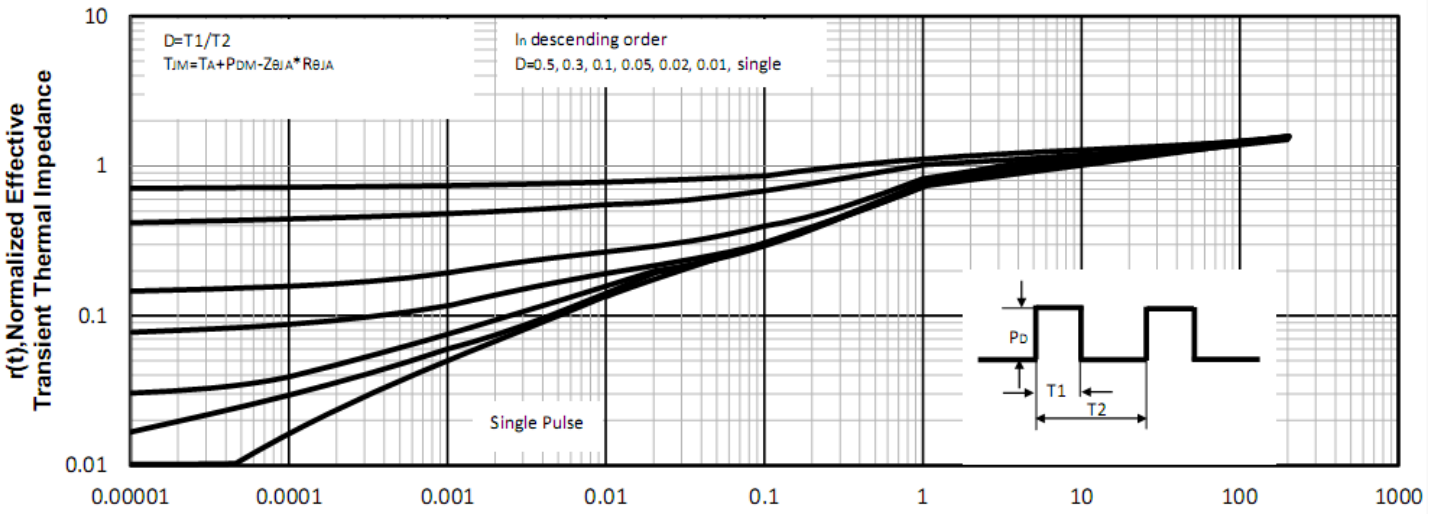


Figure20：Square Wave Pulse Duration（sec）

Complementary High Density Trench MOSFET

Test Circuit and Waveform(P-Channel):

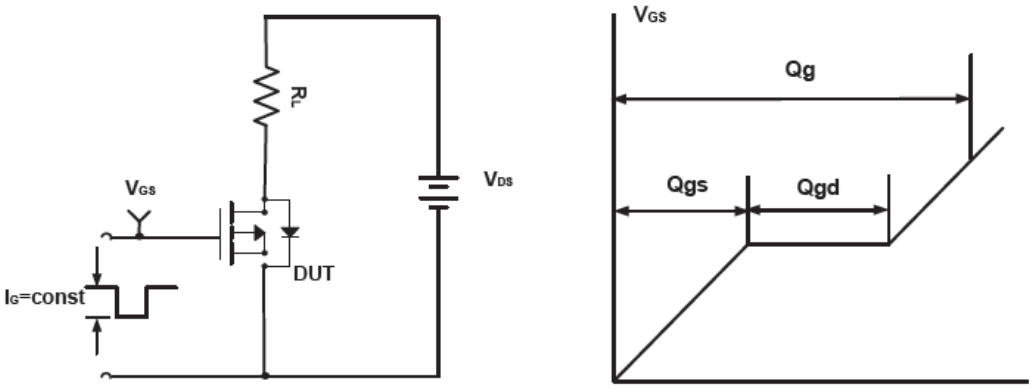
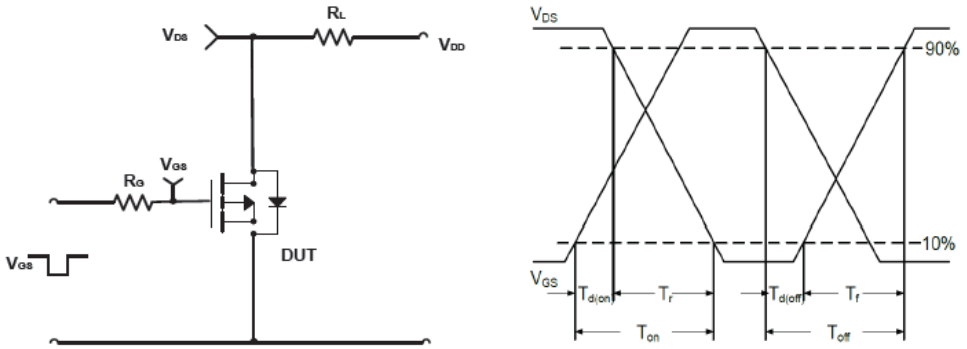


Figure D Gate Charge Test Circuit &Waveforms



FigureE Switching Test Circuit & Waveforms

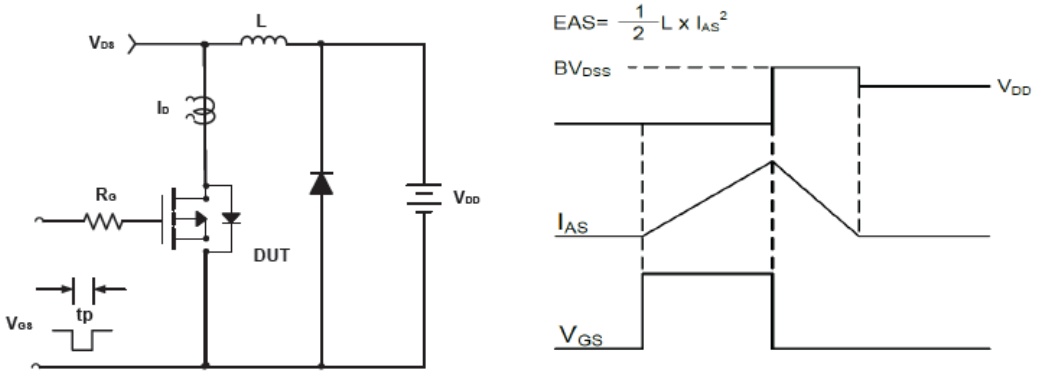
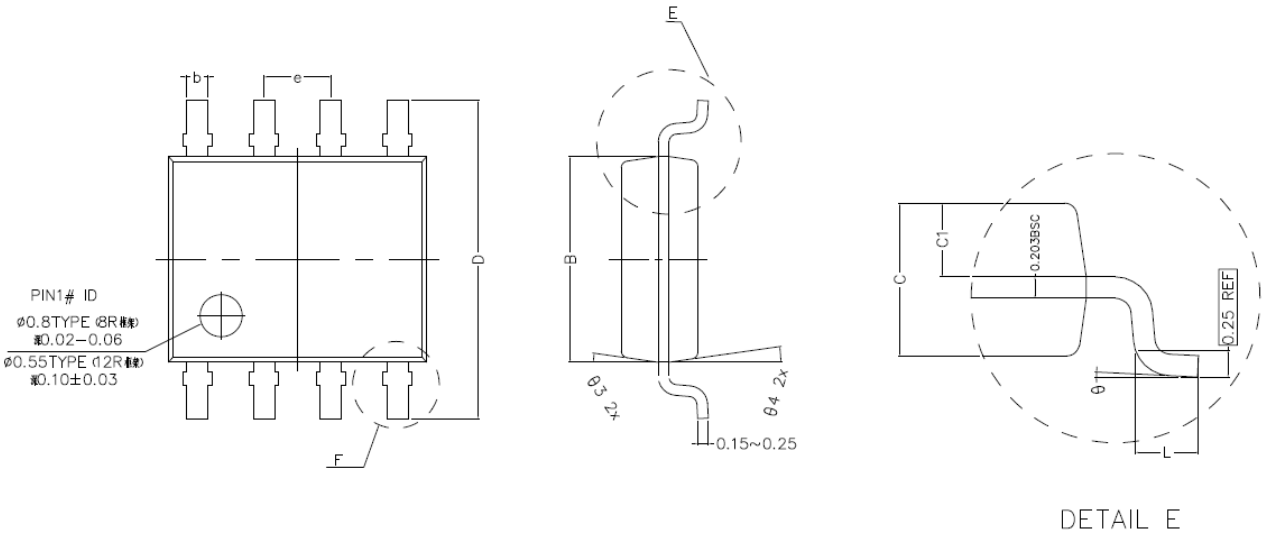
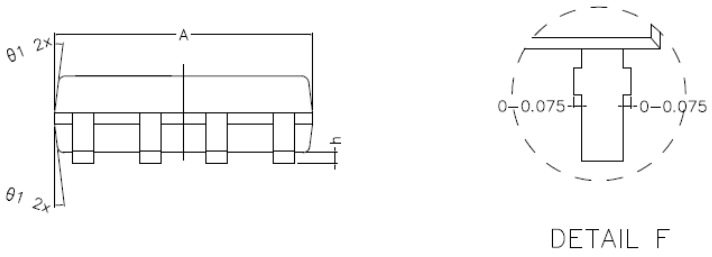


Figure F Unclamped Inductive Switching Circuit & Waveforms

Complementary High Density Trench MOSFET

SOP-8 Package Outline Dimensions (Units: mm)





COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A	4.800	4.900	5.000
B	3.800	3.900	4.000
C	1.350	1.450	1.550
C1	0.650	0.700	0.750
D	5.900	6.100	6.300
L	0.500	0.600	0.700
b	0.350	0.400	0.450
h	0.050	0.150	0.250
e	1.270TYPE		
θ_1	7° TYPE(8R)	12° TYPE(12R)	
θ_2	7° TYPE(8R)	10° TYPE(12R)	
θ_3	8° TYPE(8R)	12° TYPE(12R)	
θ_4	8° TYPE(8R)	10° TYPE(12R)	
θ	0° ~ 8°		